

Name: \_\_\_\_\_

CVEN 339 – Water Resources Engineering  
Summer Semester 2008  
Dr. Kelly Brumbelow, Texas A&M University

Exam #2

**Open-book, Open-notes (4 pages, 2 questions); Time allowed: 60 minutes**

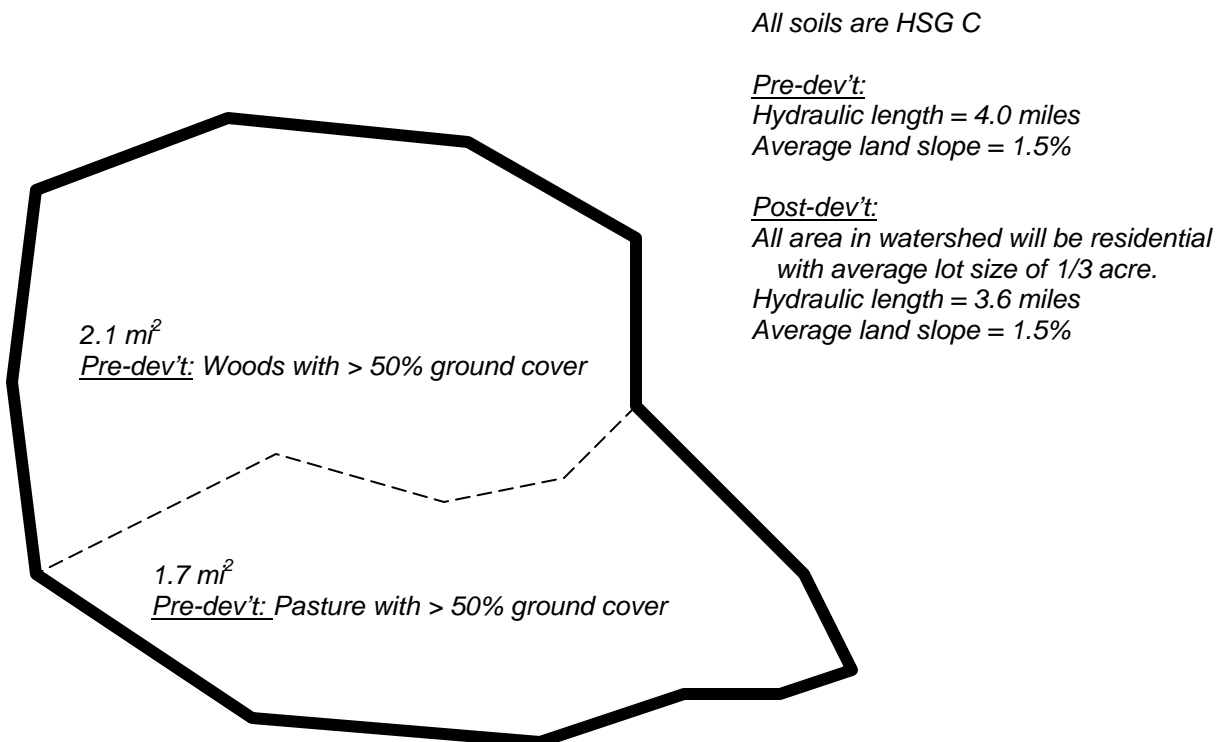
1. A watershed is currently undeveloped but will undergo significant development very soon. Characteristics for the pre- and post-development conditions are given in the diagram below. No base flow is present. The design storm for this area is 7.65 inches of rain in 6 hours.

*Using the NRCS Curve Number, lag time, and curvilinear hydrograph methods:*

- (a) Determine the runoff hydrograph for the pre-development condition;*
- (b) Determine the runoff hydrograph for the post-development condition; and*
- (c) Graph them together for comparison (a grid is provided on the next page).*

{Hint: You do not necessarily need to include all possible points for each curvilinear hydrograph – only as many as are needed to sufficiently define it.}

(50 points)

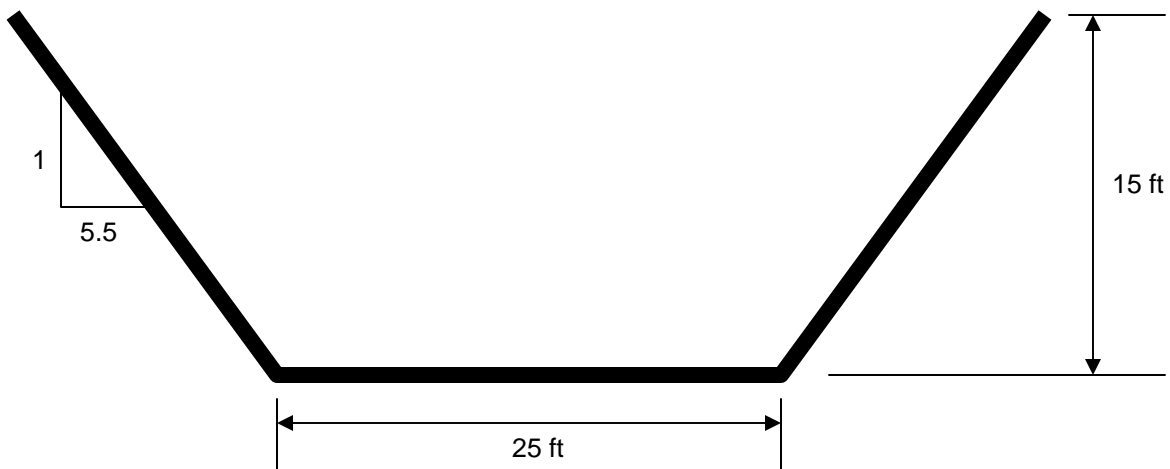



2. A preliminary design for a trapezoidal drainage channel is given below. The design flowrate through the channel is 2500 cfs.

- (a) Determine whether the design meets the design criteria for open channels discussed in class (*Fr* to avoid standing waves, freeboard, appropriate sideslopes for material and maintenance, erosion resistance). You should evaluate the design against all criteria.
- (b) If the design fails to meet one or more criteria, suggest a design change to bring it into compliance and evaluate your change. You should do this only once; if the channel still fails to meet all criteria, you do not need to continue iterating.

(50 points)

$S_o = 0.015$   
Grass-lined (grass mixture on silty clay)  
 $n = 0.021$



(Work space for #2)